

PREP

PROMOTION OF RESOURCE  
EFFICIENCY PROJECTS

## CORPORATE ENERGY AND MATERIAL EFFICIENCY ... MAKES GOOD BUSINESS SENSE

III. ISSUE 2006



## WISIONS

SUSTAINABLE DEVELOPMENT IS POSSIBLE

**WISIONS** is an initiative of the Wuppertal Institute for Climate, Environment and Energy, carried out with the support of the Swiss-based foundation Pro-Evolution, to foster practical and sustainable energy projects.

Sustainable development is possible. Numerous innovative and valuable contributions from different countries, fields and institutions have shown that an appropriate reconciliation of economic, ecological and social factors is not unrealistic utopia. We have made a promising start, but the greatest challenge still facing us in the 21st century is to learn how to use the world's resources more efficiently and in an ecologically sound and socially balanced way.

Progress is being made; however, fourteen years after the UN Conference on Environment and Development in Rio de Janeiro, many people, especially in developing countries, still lack access to resources, clean technologies, and education. At the same time, people's level of resource consumption and means of production remains unsustainable.

To meet global challenges like climate change, water scarcity and poverty, it is necessary to foster projects of potential strategic global importance by supporting them so that they can be implemented locally. Examples of good practice need to be actively promoted to a wider audience.

**WISIONS** promotes good practice in resource efficiency through its publication of relevant successful projects in its Promotion of Resource Efficiency Projects: **PREP**

**WISIONS** also provides consulting and support to ensure the potential seen in visions of renewable energy and energy efficiency can become mature projects through its Sustainable Energy Project Support: **SEPS**



Photo: Photodisc

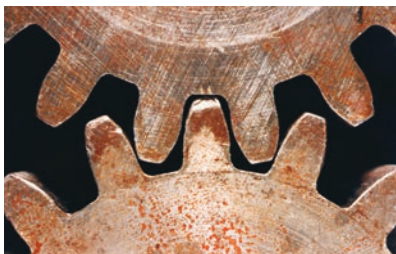
# CORPORATE ENERGY AND MATERIAL EFFICIENCY

## ... MAKES GOOD BUSINESS SENSE

The efficient use of both energy and materials is not only an environmental issue, but also a basic corporate goal. The optimal organisation (assessment, management, communication etc.) of the use of production factors such as raw materials and supplies is a central aspect of business efficiency – independent of the environmental engagement of a company.

Faced with rising energy prices and the limited availability of energy resources, corporate energy efficiency strategies are becoming more and more important. The first step has been taken in many industrialised countries and industrial energy demand has started to decline due to more efficient processes and modified structures. However, the full technical potential for increasing energy efficiency has not yet been exploited and this potential is still to be explored in relation to business options. Studies show that current energy use could be reduced by up to 50 percent without affecting performance.

Scarcity of resources does not only apply to energy resources, such as oil or gas, but is also relevant for material resources e.g. important metals like copper or zinc. Internationally, the use of



materials is high; for example the use of materials in industrial countries is currently between around 31 and 74 tonnes per capita per year. As future access to such resources will become more difficult, the efficient use of materials has

to be recognised as an important factor in competition and innovation.

As the efficient use of energy and materials is a basic corporate goal, many good practice examples already exist. However, energy efficiency and material efficiency are generally treated as separate entities, with little effort made to find common ground between the two. This is regrettable, since energy efficiency and material efficiency are often highly complementary and their integration can provide synergies that broaden the scope of their application and give more effective results – both on an environmental and economic level.

In this brochure, **WISIONS** focuses on corporate strategies for improving energy and material efficiency. **WISIONS** presents projects from Slovakia, Germany, the UK and Peru that have been successfully implemented, with the intention of further promoting the particular approaches used by these projects. Using a key number of internationally accepted criteria, the main consideration for the selection of the projects was energy and resource efficiency, but social aspects were also of relevance. The assessment of the projects also included the consideration of regional factors acknowledging different needs and potentials.

All projects that fulfilled **WISIONS** application criteria were independently reviewed and four of these, all with the potential to make a significant impact on global energy and resource efficiency, are published in the following pages. **WISIONS** is pleased to present good practice examples from ambitious projects which have been successfully implemented on different continents. All of these projects are appropriate within their local context and have been developed to a level which meets **WISIONS** selection criteria. Although uniquely

designed for a particular setting and problem, the projects presented can be adapted to different situations or can provide valuable information from their implementation phase. Links to the illustrated good practice examples shown in the brochure, as well as a couple of other



Photos: Photodisc

issue-related good practice projects, are available on [www.wisions.net](http://www.wisions.net).

The selected projects are not intended to represent the only possible course of action to take in the area of corporate energy and material efficiency but they do demonstrate promising approaches.

The next **PREP**-brochure, following the same objectives, namely to collect, evaluate and promote good practice examples, will highlight the issue of "Sustainable Biofuel Production and Use".



## CLEANER PRODUCTION AND ENERGY EFFICIENCY IN THE TEXTILE COMPANY LEVITEX

### Location:

Levice, Slovakia

### Project's Aim:

Saving energy and improving energy efficiency

### Technical Answer:

Cleaner Production audit and implementation of adequate measures



Hot lye condensate (Photo: J. Burjaniv)

Levitex was established in 1970 and the company currently employs around 670 workers. Levitex produces textiles and clothing from cotton and the joint-stock company owns a spinning mill, a weaving mill, a finishing plant and a garment plant.

The Slovak Cleaner Production Center (SCPC) carried out a Cleaner Production Assessment, starting with a preliminary audit and presentation of the possible energy savings to the management. This was followed by 3 days of training, which included the calculation of current energy losses. Based on these new skills, the project team (7 Levitex engineers and 2 consultants from the SCPC) analysed the company's energy and water consumption and established an action plan. All existing leakages — for example 2 700 kg of the not lye condensate (70 °C) per hour went into the sewage system — were repaired and additional measures were introduced. Most of the measures had a very short payback period; for example, the steam pipe insulation had a payback period

of 3 months and measures for reusing hot water contaminated with lye distillate and condensate were implemented within 2 weeks.

### BENEFITS

In addition to more efficient production processes, the benefits consist of electricity and natural gas savings, a decrease in greenhouse gas emissions (a reduction of about 16 percent or 20,000 tons annually), and savings of 2,942 GJ annually through reusing hot water contaminated with lye distillate and condensate.

The project also had benefits for the employees; it improved teamwork, working methods and the management of processes.

## SUSTAINABILITY

Top management gave their support to the whole project and the technical director was a member of the project team. The start-up was initiated with low investment solutions in relation to both maintenance and the control and management of the project. Subsequently, the company raised finance for investment into the drying machines.

All solutions were technically feasible and easy to implement. Additionally, the company received information relating to further energy saving possibilities.

## METHODOLOGY

It was necessary to gain the support of top management for the Cleaner Production Assessment. Subsequently, a preliminary audit was undertaken in order to determine the energy saving potential. Team training followed on from this. The action plan started with simple measures that could be rapidly implemented and required low investment; e.g. maintenance (heating control, repairing windows, eliminating leakages, repairing pipeline insulation).



Condensate leakage (Photo: J. Burjaniv)



Steam leakage (Photo: J. Burjaniv)

## FINANCIAL ISSUES

An overall investment of about US\$ 25,000 was required to finance the measures taken for the utilisation of distillate, the insulating of the pipes and for making improvements in maintenance. UNEP assisted with the finance for maintenance and credits or leasing arrangements were negotiated for the other technical measures.

Some measures are highly cost-effective. For example, US\$ 5,000 was invested in the reuse of hot water contaminated with dye distillate and condensate, whereas the annual benefit of this measure amounts to around US\$ 26,600.

## OBSTACLES

As the top management supported the project and Levitex engineers made significant efforts to implement the necessary measures, no obstacles hindered the project.

## REPLICABILITY

This project could easily be replicated in other locations, as water and steam leakages are common problems. The same is applicable to pipe insulation and incorrect heating temperatures. These may appear to be minor issues, but resolving these problems will produce significant financial and environmental benefits.

## CONTACT



Slovak Cleaner Production Center  
Mr. Jaroslav Burjaniv  
e-mail: [burjaniv@scpc.sk](mailto:burjaniv@scpc.sk)  
URL: [www.scpc.sk](http://www.scpc.sk)

# PIUS-CHECK — SUCCESS IN CLEANER PRODUCTION FOR SMALL AND MEDIUM SIZED ENTERPRISES (SMEs)

## Location:

North  
Rhine-Westphalia,  
Germany

## Project's Aim:

Improving Cleaner  
Production in SMEs

## Technical Answer:

Methodological  
advice for SMEs —  
the PIUS-Check



Photo: Effizienz-Agentur NRW

Effizienz-Agentur NRW (EFA) is the prime contact for businesses in the German state of North Rhine-Westphalia for all queries regarding cleaner production and resource efficiency. The agency was founded as a private company in 1998 as part of an initiative of the Ministry of the Environment, Nature Conservation, Agriculture and Consumer Protection of North Rhine-Westphalia.

EFA shows forward-looking SMEs the potential benefits offered by cleaner production (CP). The agency also demonstrates how profitable measures can be implemented in specific cases. Through specific consulting services, EFA provides businesses with on site assistance for their technical and organisational issues.

With the PIUS-Check (PIUS is the acronym of the German "Produktionsintegrierter Umweltschutz" [the equivalent of CP]), EFA provides companies with up to 500 employees in North Rhine-Westphalia with a tried and tested instrument for the development of new business opportunities. With the check, the relevant material flows and current levels of production tech-

nology are recorded and possible improvements in production are illustrated.

## BENEFITS

If all the potential options deriving from PIUS-Checks carried out to date were to be implemented, annual resource savings in production processes of € 15.9 million could be achieved. Additionally, 1.7 million cubic metres of water, 17,928 tonnes of waste and 90.4 GWh of energy could be saved. Aspects such as improved product quality, reduced waste levels or increased legal conformity are not taken into account, as they cannot be directly quantified.

The PIUS-Check can also improve the working environment in production facilities through cleaner processes, lower emissions and new procedural techniques. In many cases, through the removal or minimisation of noise or odour pollution, companies have been able to benefit immediately from the implementation of PIUS measures.



## SUSTAINABILITY

The PIUS-Check aims to encourage SMEs to incorporate CP principles into their long term business strategies and, in this way, to initiate continual improvement processes. A significant number of businesses that have organised their production efficiently as a result of a PIUS-Check continue to focus on CP. In certain industries and regions, corporate networks have been formed in order to exchange CP strategies and to inform each other of the latest developments. The experiences that are shared in this way flow into the PIUS-Check and result in a continual improvement process.

## METHODOLOGY

The PIUS-Check is a cooperation project involving three partners. In agreement with the company, EFA hires a process consultant who is concerned with the technical area in question. The consultant introduces his expertise to the project while EFA directs the overall process. The PIUS-Check proceeds in four steps: the initial discussion, the macro-analysis, the micro-analysis and the planning of measures.

The PIUS-Check comprises nine consulting days. After three or four months, the company is provided with a concrete plan of action. Subsequently, the company can begin putting these measures into place with low investment costs,



within a manageable time frame and with qualitative support from a neutral institution such as EFA. The total time involved from the initial meeting to the drawing up of the action plan is between six and nine months.

## FINANCIAL ISSUES

The PIUS-Check consultation costs on average € 6,500. EFA covers up to 70 per cent of the costs (up to € 4,500), plans and directs the project and supports the company in the implementation stage. In addition to this, EFA also supports the company in the appropriate financing of the measures through accessing suitable funding programmes.

Since the start of the project PIUS-Check in the year 2000, over 360 PIUS-Checks have taken place. 152 companies have implemented measures and introduced new and renewable production structures, with a combined investment of over € 23.6 million. The savings made in operating supplies alone amount to approximately € 7.1 million per year for these projects. Overall investment of around € 52.6 million is anticipated for all the projects that have started to date. From this, an estimated saving in operating supplies of approximately € 15.9million per year will be the result. For water, savings of around 1.8 million cubic meters per year are predicted.

## OBSTACLES

The implementation of the PIUS-Check in 2000 required an intensive awareness work at the small and medium sized enterprises by EFA staff. Many SMEs had not worked with external consultants until then and were sceptical of the EFA-proposal. Other initial problems were the relatively low awareness of the instru-

ment and the limited number of practical examples.



Photos: Effizienz-Agentur NRW

## REPLICABILITY

On the basis of the success in NRW, other German federal states have embarked on their own programmes, providing a similar analysis tool to the PIUS-Check. Since 2005, the PIUS-Check concept has been used as the VDI (Association of German Engineers) guideline 4075 for Cleaner Production. In the "Germany in Japan Year" 2005/2006, the Check was performed in several Japanese companies. Furthermore, England, Switzerland and China have shown interest in the PIUS-Check concept.

## CONTACT



Effizienz-Agentur NRW

**Effizienz-Agentur NRW**

Mr. Matthias Graf

e-mail: [efa@efa.nrw.de](mailto:efa@efa.nrw.de)

URL: [www.cleanerproduction.info](http://www.cleanerproduction.info)



## THE LAUNDRY – OFFICE PAPER RECYCLING

London,  
UK

### Project's Aim:

Increasing SMEs' share in office paper recycling

### Technical Answer:

Innovative kerbside paper collection scheme



Example of the Laundry's communications strategy (Photo: The Laundry)

In 2002 BioRegional initiated a kerbside paper collection scheme which aimed to address the main barriers to increasing office paper recycling in central city locations. BioRegional was inspired to launch The Laundry service having found that the average office bin contained up to 60 percent of perfectly good white paper and that 60 percent of business paper waste comes from SMEs, a market that conventional recycling services were failing to capture.

The scheme has opened up recycling possibilities to smaller offices that were previously unable to recycle, as paper collectors asked for several bags to be filled before they would make a collection – small offices simply didn't have the storage space. In addition to this, complicated and expensive collection charges often excluded SMEs on a price basis. The Laundry provides a weekly kerbside collection of waste paper and cardboard, with no minimum collection requirement, on a pay per use basis, making it a cheap, easy and flexible solution for small business recycling.

Collecting recyclable material is only one part of a successful recycling scheme; to make the process truly sustainable the markets for the end product needed to be driven forward, increasing demand which, in turn, makes collections more cost-effective. The Laundry promotes 'local paper loop' recycling, collecting paper from businesses that is then recycled locally to produce a recycled office paper that the businesses can buy back. The Laundry's customers can buy back 100 percent recycled paper (made from the paper they have thrown away) at a reduced rate from a local stationer.

### BENEFITS

In 2005/2006 The Laundry recycled 300 tonnes of paper. This is equivalent to 5,100 trees saved from felling and provides a saving of 180 tonnes of CO<sub>2</sub>. The ecological footprint of the local paper loop is just 14 percent of that of virgin imported paper. This is



because it uses less than half the energy, saves trees, deals with waste and is better than incineration which produces CO<sub>2</sub> emissions. Increasing recycling also delivers social benefits. Because it is a very labour intensive process, recycling creates large numbers of jobs, some of which are suitable for people with limited qualifications including those from socially excluded groups.

## SUSTAINABILITY

Over 700 offices have joined The Laundry – this amounts to approximately 6,300 office staff involved in the scheme. 99% of The Laundry customers were not previously recycling in the office at all. The Laundry recruits over 20 new businesses a month which is the result of an innovative and highly targeted marketing campaign. In the last 6 months The Laundry has collected an average of 26 tonnes of recyclables per month. 25 percent of its customers are now buying back recycled paper and, therefore, helping to close the loop. Landfill tax is rising at the rate of £ 3 per tonne per year; councils will have to raise their waste prices accordingly. When this happens, The Laundry will be in an excellent position to raise its profile further and expand rapidly.

## METHODOLOGY

Soho was chosen as the first collection area as it fitted the following criteria required for the success of the scheme. These were:

- a high density of businesses – enabling the collection to be time and resource efficient
- a high proportion of small businesses which were not already recycling



Example of the Laundry's communications strategy  
(Photo: The Laundry)

- demographic composition – it was felt that younger people would be more inclined to recycle at work and would be receptive to a new style of commercial recycling
- a working relationship was established with the London Borough Council regarding placing Laundry bags on the kerbside for collection

The Laundry focuses on the positive aspects of recycling and promoting resource efficiency. This is reflected in its 'fresh and funky' marketing materials and commended communications strategy, which has captured both green conscious businesses as well as tapping into non-green aware organisations. The Laundry maximises the opportunities for recycling by focusing on a level of customer service not usually provided by the waste and recycling sector.

## FINANCIAL ISSUES

In just three years The Laundry has moved from 100 percent funding to break even this year and become financially self-sufficient.

A proactive approach to marketing and making customer service a priority mean that there has been a steady growth in the customer base. By placing geographical restrictions on the kerbside service,

and by channelling the marketing of the service into small geographical pockets, The Laundry has been able to expand in a cost-effective manner.

## OBSTACLES

The biggest obstacles to overcome in this project were, firstly, customer recruitment and, secondly, the labour intensive nature of dealing with SMEs. The Laundry has designed a bespoke database which has streamlined the order system and uses automated processes to reduce staff hours. In terms of the collection, The Laundry has planned the route so that the 750 customers have collections in a matter of hours, thus reducing time and saving transport costs.

## REPLICABILITY

SME waste is not a problem that is unique to London. In nearly all regions SMEs are employing the majority of the population and there is no reason why The Laundry's unique focus on the SME sector could not be replicated elsewhere. Local solutions are the key to making future business sustainable, and the local paper loop represents a tried and tested solution to resource efficiency, targeting waste and encouraging the buying of recycled products.

## CONTACT

**BioRegional Development Group**  
Ms. Rachel Fleming  
e-mail: [rachel.fleming@bioregional.com](mailto:rachel.fleming@bioregional.com)  
URL: [www.thelaundry.biz](http://www.thelaundry.biz)



## CLEANER PRODUCTION ASSESSMENT AT LAVA FLASH

**Location:**

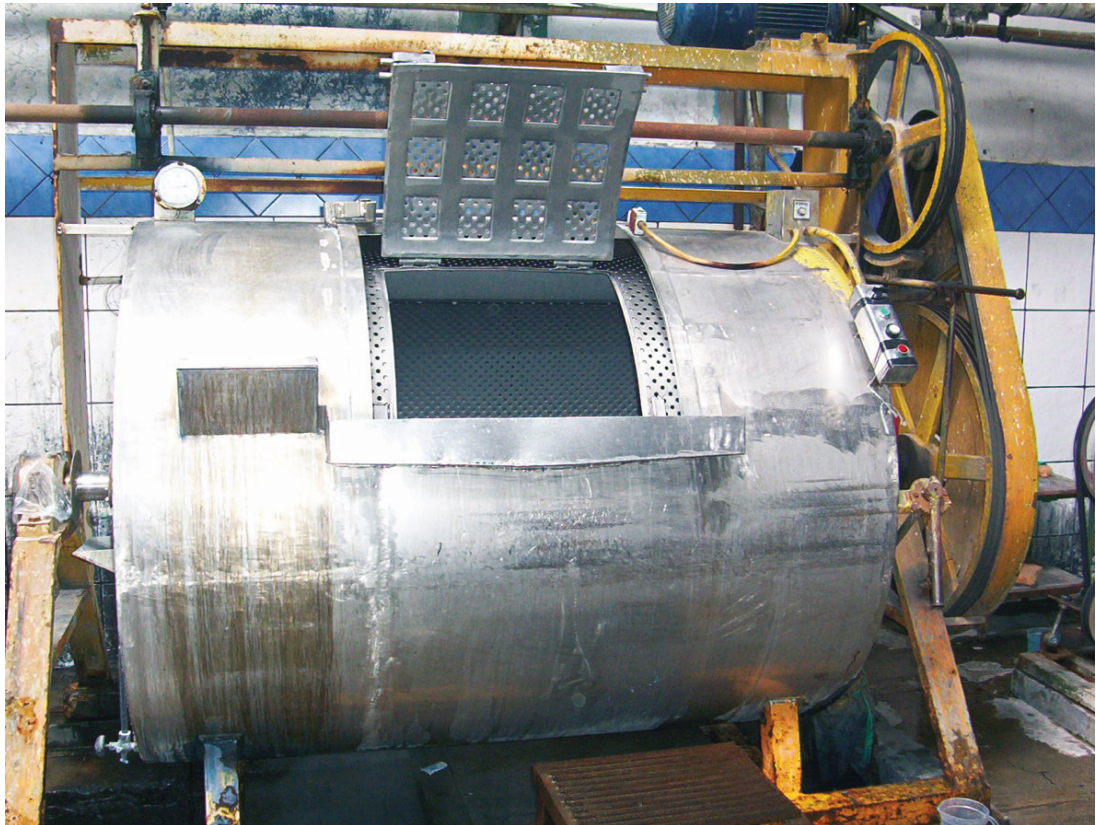
Peru

**Project's Aim:**

Discovering cleaner production opportunities

**Technical Answer:**

Cleaner Production Assessment and action plan



Washing equipment (Photo: )

The Cleaner Production audit at one of Lava Flash's production plants was conducted between 15 September and 15 October 2005. The project team consisted of industrial and mechanical engineering students and was led by an experienced professor. The aim was to discover cleaner production opportunities and to propose an action plan suited to the possibilities of this small enterprise.

During the project the team observed that, due to its nature, the plant's production process consumes a great deal of chemicals that are not used in an efficient or optimal way, and that no action is taken to treat these chemicals to eliminate certain residues that are generated by the process.

### BENEFITS

By implementing the proposed actions, the production plant will benefit in terms of health and safety, as there are lots of possibilities for improvement with low investment.

The project also has positive impacts in water and energy savings. In case of water, wastewater is not treated and the use of chemicals for washing and rinsing is not very efficient, creating post-ecological damage. Therefore, the action with the greatest potential to make a positive impact is the management of chemicals. The measures do not need substantial investment, so the company can implement them with its own resources.

By implementing all proposed measures, the economic benefits exceed the implementation costs: implementation costs of about US\$ 80,000 produce annual economic benefits of about US\$ 150,000.

## SUSTAINABILITY

The Peruvian economy has grown annually by around 5 percent to 6 percent over the last 5 years; the clothing and textile sectors are thriving. In addition, a new free trade agreement with the USA has ensured good prospects for the sector. This industrial laundry treats clothes for the local and export markets, so they have the opportunity to solve their financial and technological problems through investment that has a high likelihood of return.

The need for change is in response to new market conditions in the sector; over the last decade the international brands have become increasingly demanding in relation to the conditions in which their products are manufactured. It is very common to see requests for certificates such as WRAP, ECOTEX, ISO 14001 or for factories to undergo specific audits by external inspectors to verify environmental and social liabilities.

## METHODOLOGY

The CP assessment included, for example, recommendations for the improvement of health and safety management within all the operations. The proposed action plan for the implementation of



Auditing Team: Jose Jarama, Alfonso Leo, Mildred Linares, Miguel Carrillo, Yeneue Arias, Luis de la Torre

these measures requires approximately 5 months. Some measures represent a permanent change in practice, such as the constant revision of the air-fuel ratio in the boiler's burner and the combustion regulation of the LPG burners.

The report was sent directly to the owners of the company. The owners are now making changes in supervisory personnel and have indicated to the project team that the measures will be implemented before the end of 2006.

## FINANCIAL ISSUES

The consultancy was carried out without any need for funding; all the participants of the project team were students who wanted to develop skills in consultancy.

The study shows that water and chemical use can be reduced by up to 39 percent, saving US\$ 102,618 per year. The estimates indicate that the consumption of heavy fuel "R-500" can be reduced by 16.4 percent, resulting in savings of US\$ 40,470 per year, and that LPG consumption can be reduced by around 10 percent, or by approximately US\$ 6,530 per year.

## OBSTACLES

The most critical issue was to convince the top management that the changes were necessary. After reviewing the report and discussing the possible outcomes with the project team, the management began looking at the financial implications and evaluating the potential return on investment.

## REPLICABILITY

There are classic "low hanging fruits", where changes can be implemented at practically no cost, and measures in the

following generic processes can be replicated easily in other facilities:

The boiler: typical losses in steam piping, non-insulated supports, and recovery steam tanks and bad burning controls are common in SMEs with poor management.



Wrong pipelines installation and insulation (Photo: )

The washing and dying processes for this type of clothing use the same equipment as in other countries, where the common issue is the control of dosage of chemicals and water. In most cases high levels of water consumption and pollution of waste water are typical.

## CONTACT

Pontificia Universidad Catolica del Perú

Mr. Luis de la Torre

e-mail: ladelatorre@pucp.edu.pe

URL: www.pucp.edu.pe



90  
AÑOS



## CONTACT US:

More information about **VISIONS**,  
application criteria for **PREP** and **SEPS**, as  
well as prior **PREP**-issues are available at

[www.wisions.net](http://www.wisions.net)

Wuppertal Institute  
for Climate, Environment and Energy  
Doeppersberg 19  
42103 Wuppertal  
Germany

e-mail: [info@wisions.net](mailto:info@wisions.net)  
Phone: + 49 (0) 202 . 24 92 252

**Science Centre**  
**North Rhine-Westphalia**  
Institute of Work  
and Technology



Institute for Culture  
Studies

**Wuppertal Institute for  
Climate, Environment and  
Energy**

© Wuppertal Institute 2006. All rights reserved

## PRIOR ISSUES

- |                |   |
|----------------|---|
| I. Issue 2004  | Resource Efficient Construction   |
| II. Issue 2004 | Water and Energy — Precious Resources   |
| I. Issue 2005  | Sustainable Transport — Solutions for Growing Demand                                    |
| II. Issue 2005 | Sustainable Tourism — Combining Holidays with Local Needs                               |
| I. Issue 2006  | Microfinance and Renewable Energy — Investing in a Sustainable Future                   |
| II. Issue 2006 | Energy in Schools — Energy Education and Projects for Reducing Energy Demand in Schools |

## IMPRINT

Publisher: Wuppertal Institute for Climate, Environment and Energy  
Editorial Staff: Wuppertal Institute: Carmen Dienst, Dr. Manfred Fishedick,  
Manuel Lutz  
triple innova: Maike Bunse, Prof. Dr. Holger Wallbaum  
Photos: All images in this publication have been reproduced with  
the knowledge and prior consent of the participants.  
Lector: Katherine Penker, Perthshire, Scotland  
Layout: VisLab, Wuppertal Institute  
Printing: Offset Company, Wuppertal  
100% Recyclingpapier „Revolve matt“